

## ABSTRACT OF THE DISCLOSURE

A serverless name resolution protocol ensures convergence despite the size of the network, without requiring an ever-increasing cache and with a reasonable numbers of hops. This convergence is ensured through a multi-level cache and a proactive cache initialization strategy. The multi-level cache is built based on a circular number space. Each level contains information from different levels of slivers of the circular space. A mechanism is included to add a level to the multi-level cache when the node determines that the last level is full. The PNRP includes a mechanism to allow resolution of names which are mapped onto the circular number space through a hash function. Further, the PNRP may also operate with the domain name system by providing each node with an identification consisting of a DNS component and a unique number.